

## New homeopathic potencies promote plant growth and development

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### Introduction:

The extensive use of synthetic nitrogen fertilizer in agriculture is causing environmental damage, organic crops contain significantly more vitamin C, iron, magnesium and phosphorus and significantly less nitrates than conventional crops. In this situation it is desirable to find out suitable agents, which would increase plant growth without compromising with the quality of food and of soil. We have studied that potentized growth retardants, chlorocholine chloride CCC (2-chloroethyle trimethyl ammonium chloride) and maleic hydrazide, MH (1, 2-dihydro 3,6 pyridazinedin) can promote growth in pigeon pea *Cajanus cajan* (L.) Millsp; Lady's finger, *Abelmoschus aeculentus* (L) Moench; cow pea, *Vigna unguiculata* L. and in rice, *Oryza sativa* L. The aim of this work is to see if plant growth inhibitors serve as growth promoters at their ultra low doses .

### Methods:

We have selected two plant growth retardants viz., chlorocholine chloride CCC (2-chloroethyle trimethyl ammonium chloride) and maleic hydrazide, MH (1, 2-dihydro 3, 6 pyridazinedin). Then we prepared 30<sup>th</sup> potency of them and also 200<sup>th</sup> potency for CCC. Samples of CCC and MH were mixed separately with 90% ethanol at 1mg/ml and designated as mother tincture (MT). Each MT was diluted with 90% ethanol and succussed 10 times to prepare the 1<sup>st</sup> centesimal potency. In this way the 30<sup>th</sup> potency of two drugs and 200<sup>th</sup> potency of CCC was prepared. The controls ethanol 30<sup>th</sup> and 200<sup>th</sup> potency were prepared by succussion 90% ethanol 10 times and treated as 1<sup>st</sup> potency. Then mix 90% succussed ethanol with 90% ethanol in 1:100 and succussed, thus prepared 2<sup>nd</sup> centesimal potency. Likewise 30<sup>th</sup> and 200<sup>th</sup> potency of 90% ethanol were prepared.

The 30<sup>th</sup> potency of CCC and MH and 200<sup>th</sup> potency of CCC were treated on 15 days old pigeon pea, *Cajanus cajan* (L.) Millsp grouped in four rows each with twenty pots. Just before drug application, each potency was diluted with sterile water 1:500 and applied by foliar spray. The treatment was repeated on days 16, 17, 18, 21, 27, 33 and 42. Data were collected on day 75. Morphometric data such as plant height, number of branches, number of leaves/plant, root length and number of flower/plant were recorded. Biochemical parameters like total chlorophyll, sugar, carbohydrate and protein were assessed.

The same experiments with CCC30c, CCC200c and MH 30c repeated on Lady's finger, *Abelmoschus aeculentus* (L) Moench. Here foliar spray of drugs in dilution of 1:500 were done on day 12 and 13. Data were collected on day 75. Morphometric data like shoot length, shoot girth, shoot weight, root length, root girth, root weight, number of leaves/plant, average leaf area, leaf weight and leaf water content were taken. Total leaf chlorophyll, protein and soluble and insoluble sugar were also estimated.

The 30<sup>th</sup> potency of MH and CCC were treated on cow pea, *Vigna unguiculata* L. in 1:500 dilution by gently touch on both sides of leaf. The treatments were repeated twice after 15 days interval and final data were collected. Number of leaves/plant was recorded. Total leaf chlorophyll and protein estimated. Fast protein liquid chromatography (FPLC) was also done with the leaf material.

200<sup>th</sup> potency of CCC was sprayed on two rice (*Oryza sativa* L.) varieties viz., IET 4786-SHATABDI and IET 4094-KHITISH at Rice Research Station, Chinsurah. The drug was diluted 1:100 with distilled water and sprayed twice at fifteen days interval. Total leaf chlorophyll, protein, soluble sugar and carbohydrate were estimated. Panicle length, fertile grain percentage, number of tillers/plant, plant length and productivity /hectare were recorded.

All statistical analyses were done by analysis of variance (ANOVA) followed by student –test

## Results

In all the cases significant increase in morphometric as well as biochemical parameters were observed. In pigeon pea MH30c showed comparatively poor performance in the growth promoting effect than the potentized CCC. In Lady's finger all the potentized drugs produced significant improvement in plant growth and increased significantly water, chlorophyll and protein content in leaves. The FPLC study of cow pea leaf protein revealed that CCC 30c induced expression of some new proteins which might have played a role in growth and development of the plant. CCC200c significantly increased yields in rice under field conditions.

## Discussion

CCC in material doses inhibits the activity of the enzyme kaurene synthetase in the gibberellin (GA) biosynthesis pathway, resulting reduction in gibberellin formation. Potentized CCC has produced just the opposite effect and promotes the activity of the enzyme, resulting in increased biosynthesis of GA. As gibberellic acid biosynthesis pathway influenced chlorophyll and protein biosynthesis pathways, that is why total leaf chlorophyll and sugar and protein also increased in treated plants. GA also promotes floral initiation, sex determination and setting of fruit in plants, thus rice productivity was increased with CCC200c.

MH in material doses acts as an inhibitor of the synthesis of nucleic acids and proteins as expected MH30c produced the opposite effect and enhanced nucleic acid synthesis and protein synthesis. Thus results to promote plant growth and development.

These growth retardants in potentized forms increased photosynthesis and may help in carbon sequestration. Thereby indirectly they also help to lowering global warming and keep environment pollution free, in addition to reduce the application of fertilizers and maintaining soil ecosystem.

**Keywords:** chlorocholine chloride, maleic hydrazide, FPLC, growth

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